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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,296	01/10/2002	Chris D. Constantinides	56783	6836
21874	7590	11/02/2006		
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			EXAMINER CHAO, ELMER M	
			ART UNIT	PAPER NUMBER
			3737	

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/044,296

Applicant(s)

CONSTANTINIDES, CHRIS D.

Examiner

Elmer Chao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25,27 and 37-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25,27 and 37-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

This action is in response to applicant's amendment received on 5/22/2006.

### *Response to Arguments*

Applicant's arguments with respect to **claims 1-25, 27, 37-39** have been considered but are moot in view of the new ground(s) of rejection.

Regarding applicant's arguments with respect to Judd '112 and Weissleder '814 not relating to a method for identifying infarcted myocardial tissue of a subject using  $^{23}\text{Na}$  or  $^{39}\text{K}$  MRI comprising administering to the subject an imaging-effective amount of an iron oxide contrast agent so as to minimize signal intensity differences between ventricular cavity blood and well-perfused viable myocardium, maximize signal intensity differences between non-viable myocardium and ventricular cavity blood in myocardial infarction, and maximize signal intensity differences between non-viable myocardium and well-perfused viable myocardium in myocardial infarction, as recited in claim 16, the examiner directs applicant's attention to the office action dated 2/23/2006, where the examiner has pointed out that Judd '112 does use  $^{23}\text{Na}$  or  $^{39}\text{K}$  MRI to identify infarcted cardiac tissue. Furthermore, Weissleder '814, Ranney '762, and newly introduced reference Berg et al. (U.S. 5,128,121) all provide motivation for using contrast agents to enhance MRI imaging. Weissleder '814 and Berg '121 additionally teach the use of an iron oxide contrast agent for cardiac MRI imaging. Berg '121 also teaches the

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differentiation of signals of specific tissues through the use of negative and positive contrast agents for enhancing MRI imaging. Furthermore, it is well-known to a person of ordinary skill in the art that MRI imaging is based directly upon differences of signal intensities from different types of tissue, so the idea of maximizing and minimizing signal intensities of the different types of tissues to be detected is a very well-known principle for MRI imaging, especially coupled to the problem of better identifying infarcted tissue as disclosed by Judd '112. In fact, the purpose of using a contrast agent as suggested by Weissleder '814, Ranney '762, and Berg '121 already embodies the principle of maximizing and minimizing signal intensities. All of these reasons render the applicant's arguments with respect to claim 16 not persuasive.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-7, 9, 12-22, 24, 37-39** are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd et al. (U.S. 5,910,112) in view of Berg et al. (U.S. 5,128,121). Judd '112 teaches a method of evaluating biological tissue by imaging it with  $^{23}\text{Na}$  or  $^{39}\text{K}$  magnetic resonance and a magnetic resonance system for  $^{23}\text{Na}$  or  $^{39}\text{K}$  MRI, where the tissue is cardiac tissue, where a study is made of the subject's heart and the cardiac

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tissue is identified as normal, injured or infarcted, where the subject has or had a cardiac or cardiovascular disorder, and manipulating echo time (TE) so as to assist in identifying infarcted myocardial tissue (C1, L15-18; C3, L32-37 & 46-53; C4, L12-30; C22, L43-67; C23, L1-23; C3, L2-5). Judd '112 does not expressly teach the use of an iron oxide contrast agent so as to attenuate the  $^{23}\text{Na}$  or  $^{39}\text{K}$  MRI signal for ventricular cavity blood and viable well-perfused tissue. However, Berg '121 teaches a method of improving the contrast in MRI images by using a ferromagnetic or paramagnetic contrast agent such as an iron oxide bound to a polysaccharide (C2, L26-35) to decrease the signal level of the targeted tissue relative to its surroundings (C1, L10-38). It would have been obvious to a person having ordinary skill in the art to modify Judd '112 to include the use of iron oxide to attenuate the  $^{23}\text{Na}$  or  $^{39}\text{K}$  MRI signal for ventricular cavity blood and viable well-perfused tissue. Such a modification would enable an enhanced image contrast (C1, L10-26) so as to better distinguish viable and non-viable cardiac tissue, a criticality already established by Judd '112.

**Claims 8, 10-11, 23, 25, 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd '112 in view of Berg '121, further in view of Weissleder (U.S. 5,492,814). Judd '112 and Berg '121 disclose all of the limitations as discussed above. Judd '112 and Berg '121 do not expressly disclose the use of an iron oxide contrast agent with one or more iron atoms coordinated with a polymer having oxygen substitution, and with a dextran. Weissleder '814 teaches an iron oxide contrast agent for use in MRI, where the tissue imaged may be damaged heart tissue, such as

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infarcted myocardium, where the contrast agent has one or more iron atoms coordinated with a polymer having oxygen substitution, with a dextran and where the contrast agent is in a pharmaceutically acceptable form (C1, L16-24 & L41-55; C3, L1-11 & 28-36; C5, L7-16 & L50-63; C16, L61-67; C17, L1-12). It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the iron oxide contrast agent from Weissleder to enhance the visualization in the images of Judd '112 because the use of contrast agents in MRI to improve quality as previously shown by Berg '121, and further shown by Ranney (U.S. 5,336, 762) (C7, L48-61). Although neither Judd '112 nor Weissleder '814 nor Berg '121 specifically teach the use of MION-46, Weissleder '814 does teach the use of a variety of MION formulas that include dextran, of which MION-46 would have been an obvious choice to one of ordinary skill in the art.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elmer Chao whose telephone number is (571)272-0674. The examiner can normally be reached on 9am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EC  
10/23/2006

  
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